

REMARKS

Claim 66 is amended. Claims 25-69 are pending in the application. Claims 27, 34, 41, 44 and 62 are withdrawn from consideration.

Claims 25-26, 28-33, 35-40, 42-43, 45-61 and 63-69 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Shindo, U.S. Patent No. 5,810,983. The Examiner is reminded by direction to MPEP § 2143 that a proper obviousness rejection has the following three requirements: 1) there must be some suggestion or motivation to modify or combine reference teachings; 2) there must be a reasonable expectation of success; and 3) the combined references must teach or suggest all of the claim limitations. Claims 25-26, 28-33, 35-40, 42-43, 45-61 and 63-69 are allowable over Shindo for at least the reason that Shindo fails to teach or suggest each and every limitation in any of those claims.

The Examiner states that Shindo discloses the recited ranges of impurities claimed, and that the invention would be obvious because the claimed ranges overlap with prior art ranges. The Examiner additionally states that the invention as claimed would be obvious because where a product differs from the prior art only in purity, it is obvious except where the pure product possesses unexpected properties, and references *Ex parte Gray* 10 USPQ 2d 1922, 1925 (BPAI 1989).

First, applicant notes that *Ex parte Gray* additionally recognizes that other factors are to be considered in determining whether a purified form of an old product is obvious including whether "[a] method was known to those skilled in the field whereby the claimed material might have been synthesized" *Ex parte Gray*, 10 USPQ 2d 1922, 1925. (See also MPEP § 2144.05 (VII)). Additionally, where a specific range is claimed, the claim is non-obvious where "unexpectedly advantageous or superior properties" are conferred (MPEP §

2145). Further, each and every word of a claim must be considered when determining obviousness (MPEP § 2143.03).

With respect to independent claim 25, such recites a high purity cobalt material comprising less than 50 ppm total metallic impurities and less than 0.05 ppm Cr. Shindo discloses a high purity cobalt target which can have a Cr content of 1 ppm or less, which contains disclosed amounts of Na, K, Fe, U, Ni, Th and O, and which additionally contains “unavoidable impurities” (abstract; col. 4, ll. 1-15 and col. 7, ll. 1-9). Applicant notes that although Shindo discloses a broad range of 1 ppm or less of Cr, Shindo fails to provide any specific examples of any Cr content. Shindo does not disclose or suggest any method to achieve the narrow range of less than 0.05 ppm Cr as recited in claim 25. Accordingly, Shindo fails to enable the recited content range of 0.05 ppm Cr. Additionally, Shindo's disclosed content ranges of various elements and additional “unavoidable impurities”, does not disclose or suggest the claim 25 recited cobalt material comprising less than 50 ppm total metallic impurities, or suggest any method of achieving this limitation.

The claim 25 recited range of metallic impurities and chromium content confer specific advantages relative to the prior art. As discussed in applicant's specification at, for example, page 3, line 24 through page 4, line 10, metallics present in cobalt are undesirable due to their potential to migrate from one layer to another in a semiconductor device. Minimization of the amount of Cr in a cobalt sputtering target is specifically advantageous since Cr can cause problems with connections at semiconductor device interfaces. Shindo fails to enable the recited metallic content or Cr content range, and fails to suggest any method for achieving such content ranges. Accordingly, independent claim 25 is not rendered obvious by the Shindo disclosure and is allowable over this reference.

Dependent claims 26 and 28-30 are allowable over Shindo for at least the reason that they depend from allowable base claim 25.

Independent claim 31 recites a cobalt material comprising less than 0.12 ppm Mn and a sum total of Mg, Al, Ti, V, Cr, Mn, Fe, Ni, Cu, Zn, Zr, Nb, Mo, W and Pb of less than 50 ppm. Shindo discloses cobalt having the ranges of specific elements set forth above in addition to "unavoidable impurities". Shindo does not disclose the recited sum total of Mg, Al, Ti, V, Cr, Mn, Fe, Ni, Cu, Zn, Zr, Nb, Mo, W and Pb of less than 50 ppm. Further, Shindo does not disclose or suggest the claim 31 recited cobalt material comprising less than 0.12 ppm Mn. Additionally, Shindo does not disclose or suggest any method of achieving the recited amounts of Mn and sum total of other elements. Accordingly, independent claim 31 is not rendered obvious by Shindo and is allowable over this reference.

Dependent claims 32-33 and 35-37 are allowable over Shindo for at least the reason that they depend from allowable base claim 31.

Independent claim 38 recites a cobalt material comprising greater than 99.9% cobalt and having less than 1 ppm of Ti. Shindo does not disclose or suggest the recited Ti content. Independent claim 38 is allowable for at least reasons similar to those discussed above with respect to claim 31.

Dependent claim 39 and 40 are allowable over Shindo for at least the reason that they depend from allowable base claim 31.

Independent claim 42 recites a high purity cobalt material having less than 0.12 ppm Mn and less than 3 ppm Ti. Independent claim 55 recites a target comprising at least 99.99% cobalt and less than 1 ppm Ti. Independent claims 42 and 55 are allowable for at

least reasons similar to those discussed above with respect to independent claims 31 and 38.

Dependent claims 43, 45-54, 56-61 and 65 are allowable over Shindo for at least the reason they depend from corresponding allowable base claims 42 and 55.

Independent claim 66 is amended to correct a typographical error. Independent claim 66 recites a high purity cobalt material comprising less than 25 ppm total metallic impurities. As discussed above, Shindo discloses cobalt targets comprising specified amounts of particular elements and additionally comprising "unavoidable impurities". Shindo does not disclose or suggest the recited high purity cobalt material comprising less than 25 ppm total metallic impurities. Further, Shindo does not disclose or suggest any method for achieving the recited purity cobalt material. Accordingly, independent claim 66 is not rendered obvious by Shindo and is allowable over this reference.

Dependent claims 67-69 are allowable for at least the reason that they depend from allowable base claim 66.

For the reasons discussed above, claims 25-26, 28-33, 35-40, 42-43, 45-61 and 63-69 are allowable. Accordingly, applicant respectfully requests formal allowance of claims 25-26, 28-33, 35-40, 42-43, 45-61 and 63-69 in the Examiner's next action.

Respectfully submitted,

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By:

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VERSION WITH MARKINGS TO SHOW CHANGES MADE ACCOMPANYING
RESPONSE TO OCTOBER 23, 2002 OFFICE ACTION

In the Claims

The claims have been amended as follows. Underlines indicate insertions and
~~strikeouts~~ indicate deletions.

66. (Amended) A high-purity cobalt material comprising less than 25 5 ppm total
metallic impurities.

--END OF DOCUMENT--

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